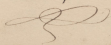


Experiments  
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Camphor  
Showing its Effects  
on the  
Human System  
by  
James Wilson  
of  
Maryland.

March 29<sup>th</sup> 1810



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As the natural history of Camphor, is at present so well ascertained, and so eminently and satisfactorily delivered by Professor Barton in his Lectures on the Materia Medica, I deem it unnecessary for me to engage minutely in the consideration of this subject. I shall however observe, that it is obtained from a species of Laurel, which grows in China, Japan, Sumatra and other parts of the East Indies.

The Camphor Tree, grows to a considerable size, and the Camphor is found in Crystallized Flakes, situated perpendicular, between the cortical and ligneous parts of the Tree. Besides these Flakes, the Tree contains other portions of Camphor, which is obtained by further processes, which have received different names, corresponding to different parts of the human body, according to its different degree of value or purity. The Camphor Tree also contains an oil, which is not inferior in quality, to the Crystallized part. The article is imported in its crude state, from China and Batavia, by the American Merchants, and it is refined or purified by us, by a chemical process called Sublimation. Camphor may also be obtained by distillation, from Thyme, Sage and Lassafras. This last mentioned article contains an oil, which is nearly allied to Camphor.

The late Professor of Chymistry, obtained this article (wood-

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household of Chaptal's Chemistry) artificially, by passing a current of Muriatic acid gas, through, Spont. Turpentinum. When obtained in this way, the Professor observes, it differs from the Laurel Camphor in its taste, which is not so bitter, in its odour, which is not so penetrating; and in the effects produced on it by the Nitric and acetic acids, the first of which, dissolve it by a reciprocal decomposition; the latter, not at all, while both dissolve Camphor rapidly.

Having given a brief detail of the history of this article, which I considered all, and probably, is more, than was really necessary; I proceed to the immediate object of my Dissertation; in which I design to consider the effects of products by Camphor on the Human system.

A correct knowledge of the Nature of this article, is certainly necessary, in order to apply it with success to the purposes of Practice. This knowledge however, I am far from promising; for a complete elucidation of its nature, I do not aspire at; being fully apprised of the abilities the subject has commanded; my only object being in complying with the regulations of this University, to relate with correctness a few experiments, which I hope were made with accuracy, and without being prejudiced by preconceived opinions.

Perhaps I have been too general in the Title of my Thesis, and it might have been more proper for me to have been more limited, and only to have considered its effects on the

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pulse, on which, it is true, it did manifest itself principally; but as other effects were produced, I concluded it my business to relate them. 'Tis true, I have not increased the quantity of the article, to that degree, which was necessary to produce many of those alarming effects, such as, delirium and convulsions, which it will produce if taken in doses sufficiently large; but I have gone so far as to be convinced, that all those effects, would have been produced, - had I have continued to have increased the dose of the article. Such effects, I thought too serious to trifle with, and supposed that as accurate a knowledge of its nature, might be determined, with as much precision, by confining myself to small ~~and~~ <sup>and</sup> ~~small~~ <sup>smaller</sup> doses. For instance, if it be positively ascertained, that in doses of twenty grains it produces effects, equal in violence, only by one half, to those related to be produced, by ~~thirty~~ <sup>forty</sup> grains of the article, we may from the safest and truest analogy conclude, that in equal quantities, it would produce effects equal in degree. Dr. Cullen has reduced the point of controversy on this subject to one single question. viz. Whether is Camphor a cooling or a heating medicine, as it respects the human body? or in other words; whether has it a Sedative or Stimulant effect? Both sides of this Question have had their advocates, and many; the arguments deduced and experiments made, to establish their respective opinions.

That opinion which supposed it to be of a Sedative or cooling nature, was adopted by the Physicians of the 17<sup>th</sup> century

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of which respectable number, I shall only mention Dr Cullen; who supposes, it to be of a highly sedative and cooling nature and all together unconnected with the least stimulant effect. Dr Cullen in his history of this article remarks, that it operates on the nerves of the Stomach, and by those on the rest of the system and this operation he observes, is entirely <sup>that</sup> of a sedative power.

I ~~do~~ not my intention to enter into the *modus operandi* of this article, and I have only quoted the above sentence to show, his belief in its direct sedative effect. To this I will observe, that it might be supposed that, the very name of Cullen, would be sufficient to sanction the notion of its sedative power; but in my opinion, the Classification of this article, with others, such as, Opium and Alcohol, articles which are known to be the most powerful Stimulants: should be considered as a sufficient refutation of this doctrine.

The effects produced by opium and alcohol are considerably allied, to those produced by Camphor, <sup>and they are,</sup> as already mentioned unquestionably, stimulants. Moreover I do not consider the effects which are admitted to be produced by Camphor as indicative of a sedative power in the article, <sup>but</sup> on the contrary it must prove it to be certainly possessed of a stimulating effect. Dr Cullen next notices the effect of this medicine, on the sanguiferous system, the consideration of which is more to my purpose. Thus the Professor is equally decisive in favour of its sedative effect, and observes, that here, at least we can assert, that it

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shows in the first instance no stimulating power. Dr Cullen here mentions several authors, who in a great number of instances never found it to increase the fulness and frequency of the pulse, nor heat of the system. Some of them, however, and show, that the pulse was rather reduced in frequency, by large doses of the article. Professor Cullen himself observes, that he has frequently given twenty grains of the article without finding the frequency of the pulse increased; but on the contrary, manifestly diminished. The case of a nautical patient is related, in whom the pulse was reduced ten strokes in the minute by thirty grains of camphor. To this opinion of professor Cullen we might be disposed to subscribe; could not authority equally respectable, be deduced in support of the contrary opinions which suppose it to possess the stimulating property in a great degree; but still not equally stimulating with others. To the opinion, then, of Professor Barton, I am from his authority, and from the effects which the article had on me, certainly disposed to assent, who believes it to be a stimulant, and that in those cases in which it was thought to manifest sedative effects it was in consequence of the second and third effect of the article being attended to, while its primary <sup>only</sup> ~~were~~ <sup>were</sup> ~~was~~ overlooked. To this purpose I determined to chuse it for the subject of my Dissertation, and to make some experiments to observe its effects on myself, attending to its operation from the first moment it was given taken. The relation of these experiments

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shall then constitute the remaining part of my thesis.

I am moreover inclined to believe in its stimulating nature from the appearance of inflammation in the Brain, Stomach and Intestinal Canal, as exhibited on the dissection of those persons destroyed by excessive doses of the article.

Is not its stimulating effect, also evident, from the power of the article in producing a translocation of the disease; for instance, the translocation of arthritic affections, from the extremities, to some one or more, of the viscera of the abdomen, by its external application, to the affected part. The translocation of the disease from one part, to another, consists in making a part artificially weak; to which weak part, the disease is to be translocated. Now if this article possessed the sedative power, which has been <sup>prematurely</sup> attributed to it: in stead of causing the disease to desert the part affected; it would have the direct opposite effect, and confine the disease to the part already affected.

I shall now proceed to relate a few of my experiments, which I am far from considering as not being liable, to the fate perhaps of all others, viz. that of being refuted, and disproven; for different persons may be affected in different ways, by the same medicine, and even the same person may be affected differently at different times, according to the exciting and varying states of the System - although to the purpose, experiments have been before made and often repeated, and attended with effects, in some instances corroborative of mine, and in others

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in opposition to them; yet still I hope, that the repetition of them will not be considered as useless or effete. As I proceeded the experiments were varied as much as possible; taking the article in different doses, and at different periods of the day, and in different formulas. That I might have them still less exceptionable, I prevailed on a few of my friends, to assist me, by taking the article; and in them the effects were ~~the~~ similar, as will appear from the detail of the particular experiments. as for its effecting me so immediately after being taken; I can only account for that circumstance; from my system being in an extremely excitable state, in consequence of my not being in the habit of using either spiritous or fermented <sup>liquors</sup> of course affected by the most trivial stimulus.

Having made those preliminary observations; I commence with the detail of particular detail of my experiments.

### Experiment 1.

On the nineteenth of March I took at one o'clock I took fifteen grains of Camphor rubbed down in water; my Pulse beating Seventy two strokes in the minute, as ascertained by three tests with the Pulse Glap. It was also natural in other respects. It effected me as follows.  
First on the Pulse.

Am . . . . .	5	10	15	20	25	30	35	40	45	Minutes
Pulse Beat.	74	77	79	76	74	72	72	72	72	strokes

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The medicine was not detained in my mouth for any time and produced no obvious change in its temperature. In about eight minutes after the medicine was taken; I experienced some degree of heat at Stomach, which continued to increase for a few minutes and then subsided. In about fifteen minutes time my Pulse became fuller and stronger, which continued for some time, and then returned to its natural standards. In twenty minutes, my head was sensibly affected with giddiness and confusion. at thirty minutes my face was flushed, <sup>in</sup> about forty or fifty minutes my Fore-head became warm and moist and about this time, the affection of my head began to subside, and in a short time totally disappeared.

### Experiment. ii.

On the same day, at thirty minutes past eight o'clock at night; I took twenty grains of Camphor, in the same formula as the preceding; my Pulse being sixty eight beats in the minute by three examinations with the Pulse Glass. also weak and soft. It effected the pulse in frequency as I shall relate in the Scale.

In. . . 5. 10. 15. 20. 25. 30. 35. 40. 45 Minutes  
Pulse Beat. 71. 72. 75. 78. 74. 70. 68. 68. 68 strokes  
my Pulse was occasionally examined after this, but did not descend below the natural standard. The medicine

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produced a considerable heat at Stomach, similar to the preceding except, in violence, the present being greater. about the same time as in the preceding experiment my pulse was considerably increased in Force and frequency; which continued for more than one hour and then resumed its natural state. About fifteen minutes after it was taken, my head was affected with the same symptoms as related in the preceding experiment, differing only in violence. This affection of my head continued for ~~some~~ considerable time, and it had not gone off entirely when I retired to bed, at my usual hour.

### Experiment<sup>e</sup> iii.

On the twentieth, at ten minutes past eleven o'clock in the morning; I took twenty five grains of Camphor in the same formula; My Pulse beating sixty six strokes in the minute. From the same number of trials with the Pulse Glap, also being natural in other respects. My pulse was affected in the following manner.

In . . . 5 . 10 . 15 . 20 . 25 . 30 . 35 . 40 . 50 Minutes  
Pulse Beat. 74 . 74 . 75 . 72 . 68 . 66 . 66 . 66 strokes

When examined sometime after this it was found to be still at sixty six. It created a burning sensation at my Stomach. My Pulse was increased in fullness as in the experiments already related. In fifteen or twenty minutes my head became

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affected with the same symptoms, and increased considerably, continuing to be affected the whole afternoon, in some degree. This afternoon my head was also affected, with a dull heavy pain.

As I have related three experiments, in which the medicine has shown a <sup>decidedly</sup> stimulating effect, when exhibited in the manner above mentioned, I now wished to ascertain if the effect would be similar when given in Pills, so as to present its action, by its volatility as much as possible.

### Experiment IV.

On the twenty first, at thirty minutes past twelve o'clock, I took thirty grains of camphor made into Pills, my Pulse being natural beating sixty six strokes in the minute. My Pulse was affected as related as related in the preceding state.

Ins. . . . . 5. 10. 15. 20. 25. 30. 35. 40. 45. 50 Minutes

Pulse Beat 69. 73. 78. 75. 71. 68. 65. 64. 64. 64 strokes

My Pulse remained at sixty four, when examined some time after the expiration of one hour. About ten minutes after taken, it produced considerable heat at Stomach. My Pulse in ten or twelve minutes was considerably increased, in fullness and Tension. In about the same period my head became affected with vertigo and confusion; which symptom increased so rapidly and being also accompanied

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with a sensation of fullness and throbbing, that I apprehended a smart fever would be the consequence. Those symptoms continued for a considerable time, and were also attended with pain in my head. My Pulse remained tense and full some time and gradually returned to its natural state. The affection of my head continued all the afternoon, and until I went to bed. I was much disposed to sleep. In the morning those symptoms were nearly gone; but my room mate, observed a considerable excitation of blood, in the small vessels of my Eye; which I on examination discovered, was evidently the case.

### Experiment V.

On the twenty second, took thirty five grains in Powder, notwithstanding the effect the last portion had on me. It was taken at five o'clock in the afternoon. My Pulse beating sixty six strokes in a minute, and being also, natural in other respects, it affected me as follows. List of the Pulse.

In . . . 5. 10. 15. 20. 25. 30. 35. 40. 45. 50. minutes  
Pulse Beat. 71. 76. 80. 77. 73. 68. 65. 66. 66. 65. strokes

My Pulse was occasionally examined, but remained at sixty six strokes. About the fortieth minute my Pulse again increased in frequency, which continued for twelve or fifteen minutes, and then returned to its natural standard. This I can only account for; by supposing, some portion

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of the article on its introduction into the stomach, being enveloped by its contents and at this moment being extirpated, produced of course, its proportional effect. In ten minutes my Pulse became full and tense, which continued for a considerable time, and then became natural. In about fifteen minutes after the article was taken, my head was affected with giddiness &c. The symptoms speedily increased, attended with pain in the head, Flushing of the Face; untill a high state of intoxication was induced; this continued for two hours, and terminated in an irresistible disposition to sleep, which became so oppressive, that I was under the necessity of indulging it at an early hour. On rising next morning, and examining my Eyes, I found the inflammation considerably increased; my head being still affected, with dullness, heaviness and confusion; which continued all day (The inflammation of my Eyes by rest and abstinence diet soon disappeared.

These Experiments, I think tends in some measure to prove its stimulant effect. They were all repeated; but as the effects were similar, it would be occupying time unnecessarily to transcribe them. I also Experimented with the article in smaller doses, in the first instance; which produced effects proportioned to the quantity taken: but then I thought it unnecessary to state; mentioning only, those Experiments, in which it was taken in sufficient quantity

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to produce obvious effects.

I cannot but regret, from the result of these experiments being so analogous to the effect produced by ardent Spirit; that the Article must unquestionably be a stimulant, and nearly resembling, that article in its stimulant nature. To this, I shall, <sup>very</sup> add, that I must regret, that it was not convenient for me to obtain a Thermometer, to determine whether the Temperature of my body was sensibly increased or not.

I shall now relate a few experiments, which were made with a view to determine whether the volatile parts of Camphor; would produce the same effect; as the article when taken in substance.

### EXPERIMENT VI.

On the twenty third, I determined to inhale the vapour of Camphor: and to preclude all communication with my ~~mouth~~ nose, closed my nores and then applied my mouth to the article for the space of twelve minutes. My Pulse beating seventy two strokes in the minute, and being natural in other respects. Its effects as will appear, were nearly similar, to those produced by the internal use of the article. My Pulse was examined from the moment the article was taken, and was effected as follows.

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Pulse Beats . 75. 78. 80. 80. 77. 74. 72. 72. strokes.

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My Pulse continued at this when examined for a considerable time afterwards. In this case, ~~when~~<sup>as</sup> when taken internally the Pulse was increased in fullness about the same period. This continued for twelve or fifteen minutes, and then began to subside, and shortly became natural. My head was slightly affected. This was twice repeated and the result the same.

### Experiment VII.

On the same day in the afternoon, wishing to determine, what would be the difference in the effect produced by receiving the Vapour in my lungs and my nose, I closed my mouth and applied my nose, to the Camphor: having my Pulse examined from the first application. My Pulse beating seventy two strokes in a minute effected the following effects on the Pulse.

In. . . 5 . 10 . 15 . 20 . 25 . 30 . 35 elapses

Pulse Beat. 75 . 78 . 81 . 77 . 74 . 72 . 72 strokes

At this my Pulse remained stationary. In the meantime my Pulse became full and my head affected with vertigo and giddiness, and increased so greatly as to oblige me, to desist from smelling the article. The effect on my head and fullness of my Pulse, was only momentary and in the course of forty or fifty minutes became natural. This was once repeated, and the effect the same.

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Having now ascertained its stimulant effect on myself, both in substance and in vapour, I next wished to see, what would be the effect produced by it on other persons. This I should if attended with similar effects, would greatly contribute to the support of its stimulant nature. For this purpose I prevailed on a few of my friends to assist me on this occasion; and My Friend Mr. ed- was so obliging as to consent to be the subject of the following experiment.

### Experiment viii.

On the twentieth of the Month Mr. ed- took twenty grains of Camphor rubbed down in water. It was taken at thirty minutes past twelve o'clock. His Pulse beating Eighty strokes in a minute, and being also natural in other respects. It affected him as follows. First on the Pulse.

In . . . 5. 10. 15. 20. 25. 30. 35 minutes

Pulse Beat 88. 86. 88. 87. 85. 82. 80 strokes

At this it remained. It produced a burning sensation <sup>in</sup> the stomach. In ten minutes his head became affected with piddiness and confusion. The Pulse became tense and full, which continued so, for upwards of thirty minutes and then gradually returned to its natural state. The affection of the head, became increased, attended with Throbbing, Pain, and Flushing of the Face, which continued for two hours and then went off. <sup>May</sup> It not being amiss to

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Observe, that, this Gentleman, was unacquainted with the nature and intent of this my experiment; and am sure he related every thing as it actually occurred. This was repeated with a similar result.

### Experiment ix

On the same day in the After noon My Friend Mr. — subject to nervous head ache and at this time labouring under a slight affection of it, consented to take twenty <sup>grains</sup> of Camphor by my request. He expected him, as I shall detail — First observing its effects on the Pulse. & Pulse. seventy <sup>beats</sup> in the Minute.

In . . . 5 . 10 . 15 . 20 . 25 . 30 . 35 . 40 minutes

Pulse Beats. 75 . 78 . 81 . 79 . 76 . 72 . 71 . 72 strokes

At seventy it remained. He excited some burning sensation at the Stomach, that the article did in all the preceding experiments. In twelve minutes, it could distinctly be perceived that the Pulse had increased in frequency. In about twenty minutes, Face became Flushed and the affection of the head before mentioned now disappeared entirely, and the Gentleman declared he had not experienced such a complete respite from his affection for some time. This flattering appearance, was only transitory; for in twelve or fifteen minutes it returned, but with a considerable aggravation of the symptoms. He now complained of giddiness, and a dull pain in the Eyes; which in a few minutes left

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the Eyes, and fixed in the forehead. The increased Fulness and Tension of Pulse, continued for sometime, and then returned to its natural State. The head was affected with giddiness, confusion, and a dull heavy pain, which continued, all the afternoon.

### Experiment X.

On the twenty fourth, at eleven o'clock A.M. — at my request took fifteen grains of Camphor. His Pulse beating Sixty eight strokes in a minute. Its effects ~~were~~ <sup>were</sup> as follows.  
First on the Pulse.

On. . . 5 . 10 . 15 . 20 . 25 . 30 . 35 . 40 Minutes

Pulse Beat. 71 . 74 . 77 . 75 . 72 . 68 . 68 . 68 strokes

At fifty eight the Pulse remained. In about twelve minutes the Pulse became full and Tense; which continued for thirty or Forty minutes and then gradually returned to its natural standard. The head became affected in fifteen minutes, after the medicine was taken, with giddiness, &c. Those effects continued for more than an hour, and then disappeared. This was repeated with similar results.

### Experiment xi.

On the afternoon of the same day A.M. — consented to take twenty grains of Camphor for my purpose. His Pulse previous to taking it was, at fifty eight strokes in the

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minute. He was affected by it as follows. First its effects on the Pulse.

In . . . 5 . 10 . 15 . 20 . 25 . 30 . 35 . 40 minutes  
Pulse Beat. 72 . 76 . 79 . 77 . 74 . 71 . 68 . 68 strokes

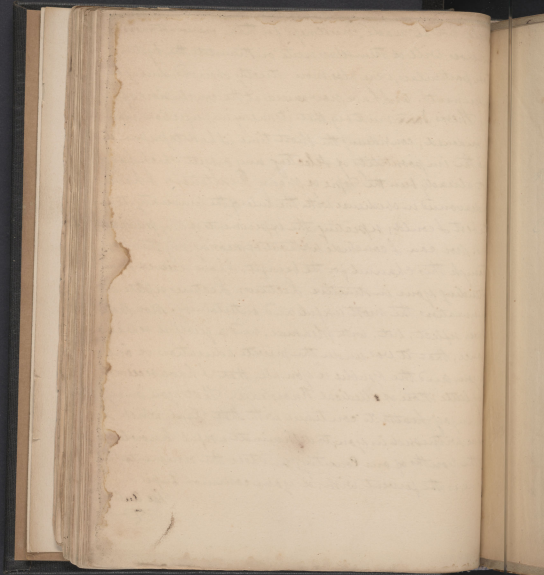
The Pulse remained at sixty eight, for a considerable time afterwards. The Sensation produced at the Stomach, was similar to that produced in the other instances. In twelve minutes after taken, it produced fulness of the Pulse, which continued the usual period, and then returned to its natural state. In about fifteen minutes the head became affected with giddiness, fullness, and a dull pain. These effects continued the greater part of the afternoon, and then disappeared altogether. It may be worth relating that neither of the last Gentlemen, were acquainted with the real or supposed nature of the Medicine, of course, they could not have been influenced, from any previous knowledge of the article.

Perhaps in the relation of those experiments I have not been sufficiently minute, as it regards the pulse, for I considered it would be sufficient to come within one Pulsation, of what it actually was. In all of those cases I was particular to keep quiet for a considerable time previous to the administration of the article, and also carefully avoided all other causes, such as Laughing, Talking, eating and drinking; knowing that if all those circumstances were not attended to, the experiment

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would not be made <sup>with</sup> correctness; for those circumstances  
exercises will of themselves excite or stimulate the system,  
those particulars, were also more strictly observed, during the  
experiments. As I have now arrived at the conclusion of  
my Thesis, I ~~am~~ must beg, that its many imperfections may  
be pardoned; considering the short time, I had to prepare it  
and the impossibility of selecting any subject which has  
not already been the Topic of many Dissertations. I have  
endeavoured in obedience with the rules of the University, to do  
the best I could; repeating the experiments of my predecessors.  
Nor can I conclude without expressing my thanks,  
through this Channel for the benefit, I have received from  
attending your instructive Lectures; Lectures, replete with  
information the most useful and entertaining. Nor shall  
I ever reflect, but, with pleasure, and a grateful remem-  
brance, that it was under the private education of one  
of you; and the trouble of you all, that I have received  
my little store of medical knowledge. That you may  
all enjoy health to continue with that Zeal, which I  
have witnessed in you, to disseminate useful knowledge  
to the youths of our Country; and to be the ornament of the  
same, is the fervent wish, of your common Pupils.

The Author  

Vm.

*Picula maculata*

Marsen & Bueck

1812-